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(54) COLD CATHODE DISCHARGE TUBE

(57) Abstract:

PURPOSE: To prolong the operational lifetime of a cold cathode discharge tube by forming a cathode of pure aluminum having a purity of 99.8% or more, and finishing an electron emitting surface in a face roughness of $0.2\mu\text{m}$ or less at the highest.

CONSTITUTION: A raw material made of pure aluminum having a purity of 99.8% or more is roughly cut into a specific cathode shape. The roughly-cut cathode is finely cut in a face roughness of $0.2\mu\text{m}$ or less at the highest by a diamond tool, followed by washing, and then, a thin film made of aluminum oxide is formed on

the surface by natural oxidation without applying any special heat treatment. As to the cathode made of pure aluminum, a current bias is decreased and the face roughness required to obtain a long operational lifetime is $0.2\mu\text{m}$ or less at the highest. The above face roughness can be obtained only by the fine cutting by means of the diamond tool, thereby obviating the necessity for the other finishing machining. Therefore, a cold cathode gas discharge tube having a long operational lifetime can be easily manufacture without such drawbacks as a control of impurity content, management of a heat treatment and the like.

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